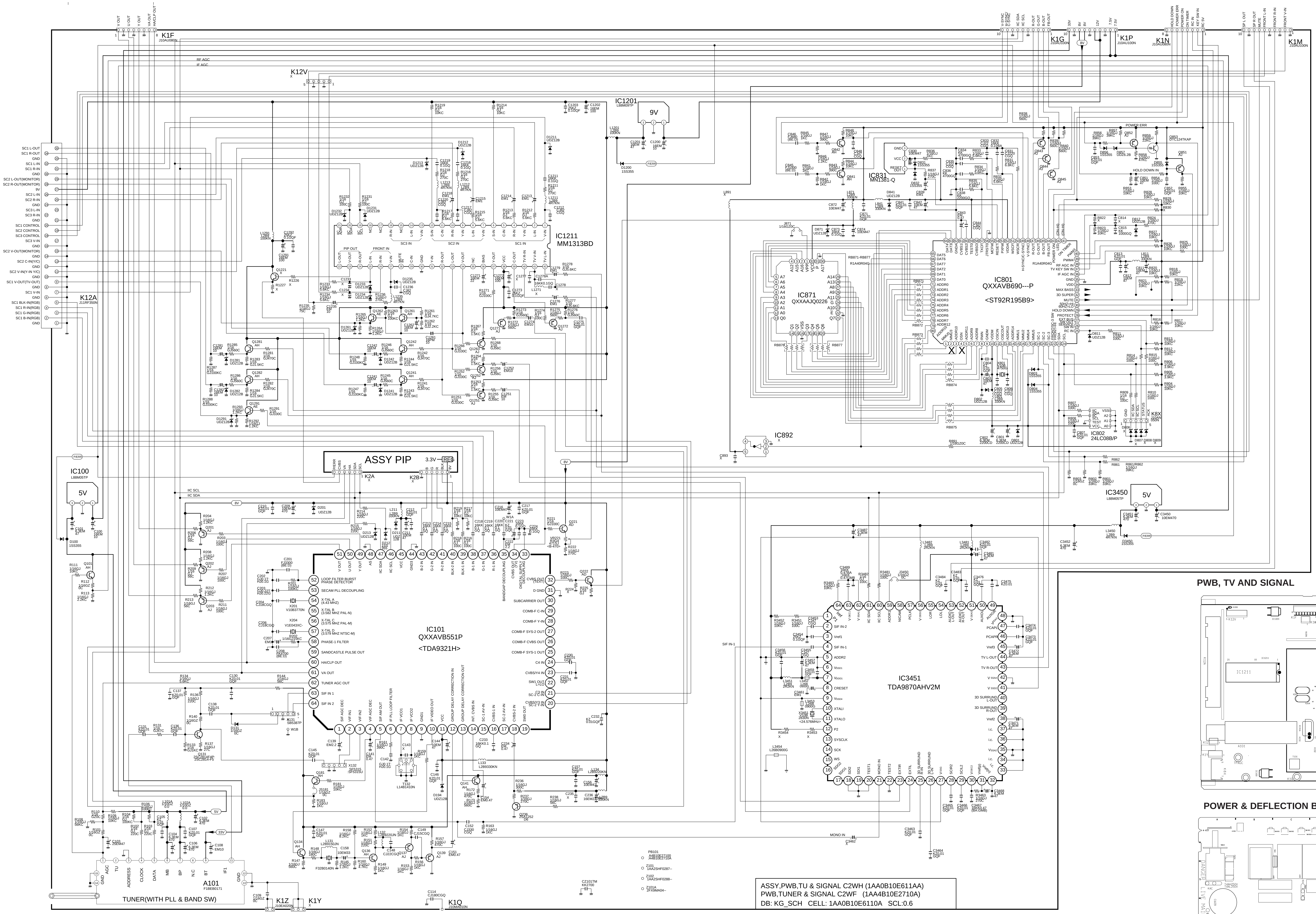
# SANYO CE-28H2C

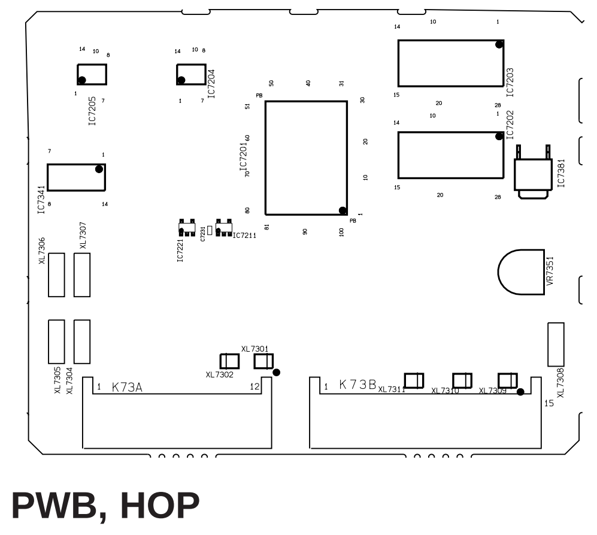
MODEL

SERVICE MANUAL

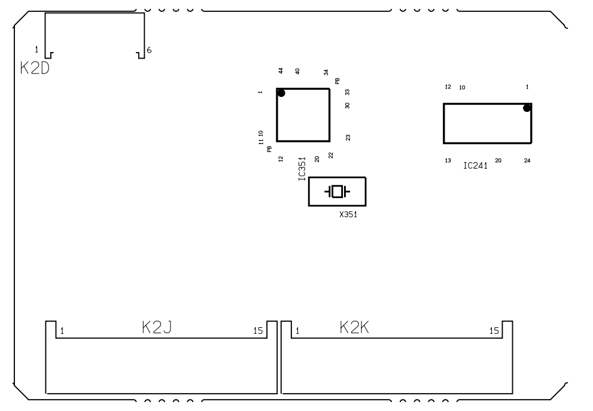


ASSY,PWB,TU & SIGNAL C2WH (1AA0B10E611AA)
PWB,TUNER & SIGNAL C2WF (1AA4B10E2710A)
DB: KG_SCH CELL: 1AA0B10E6110A SCL:0.6

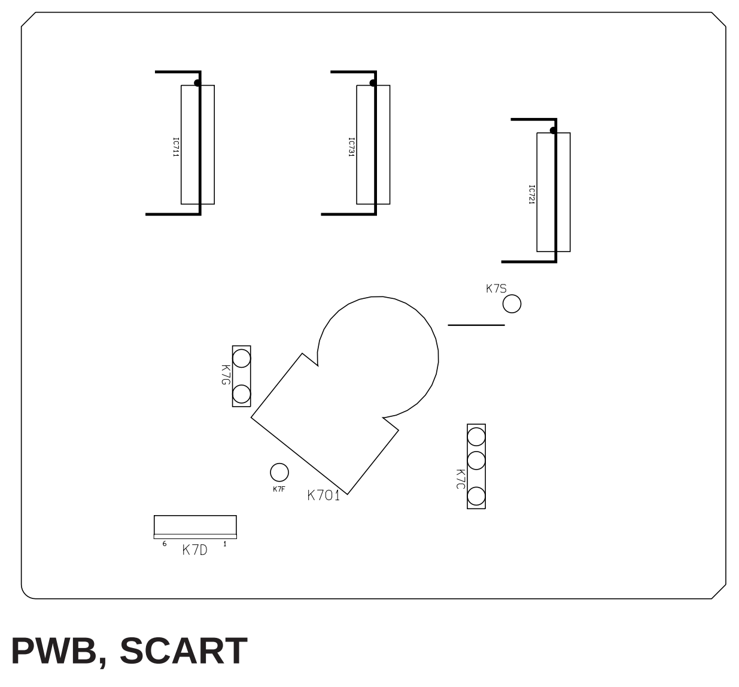
## PWB, SCAN CONVERTER



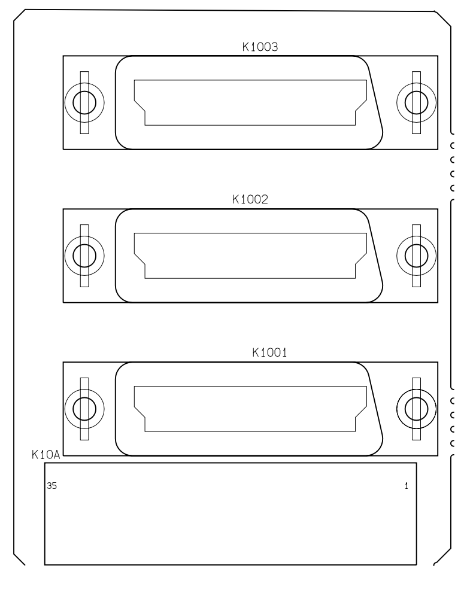
## PWB, HOP



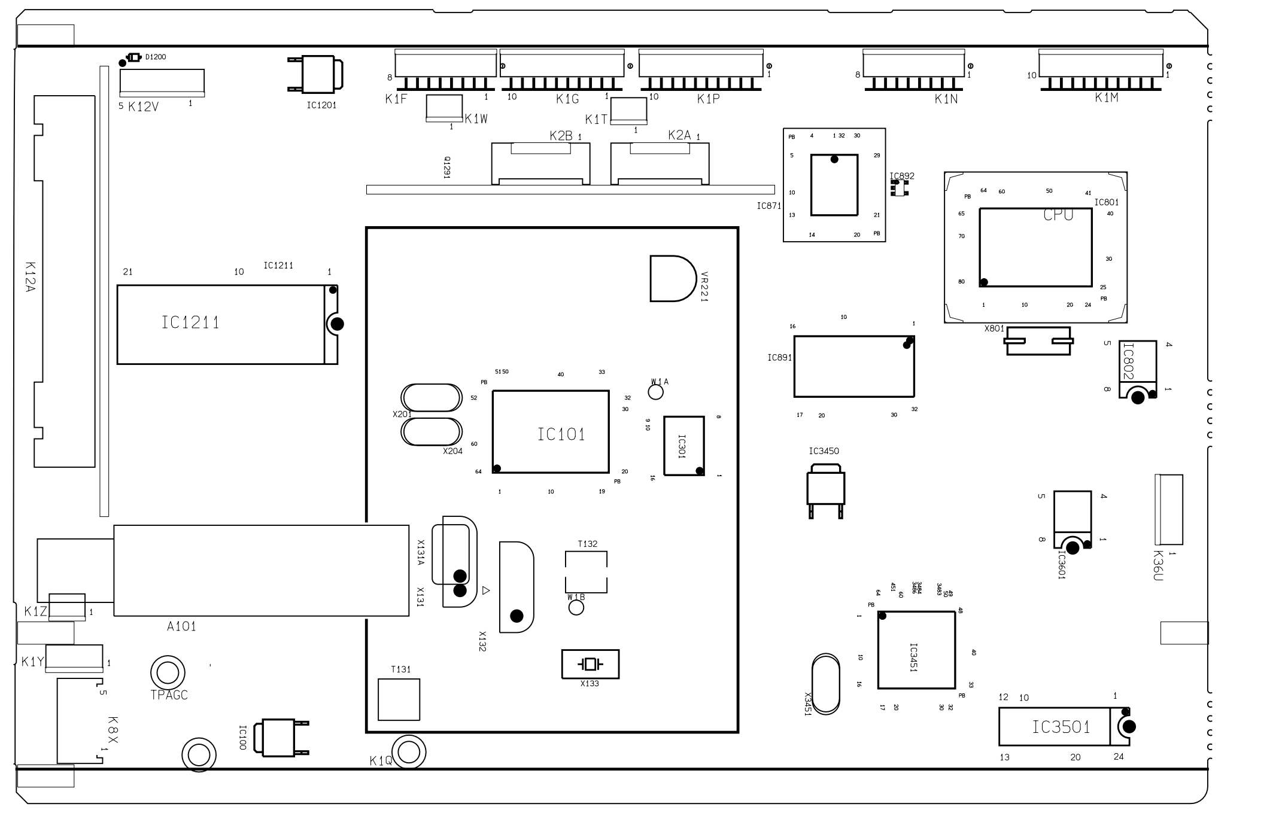
## PWB, CRT



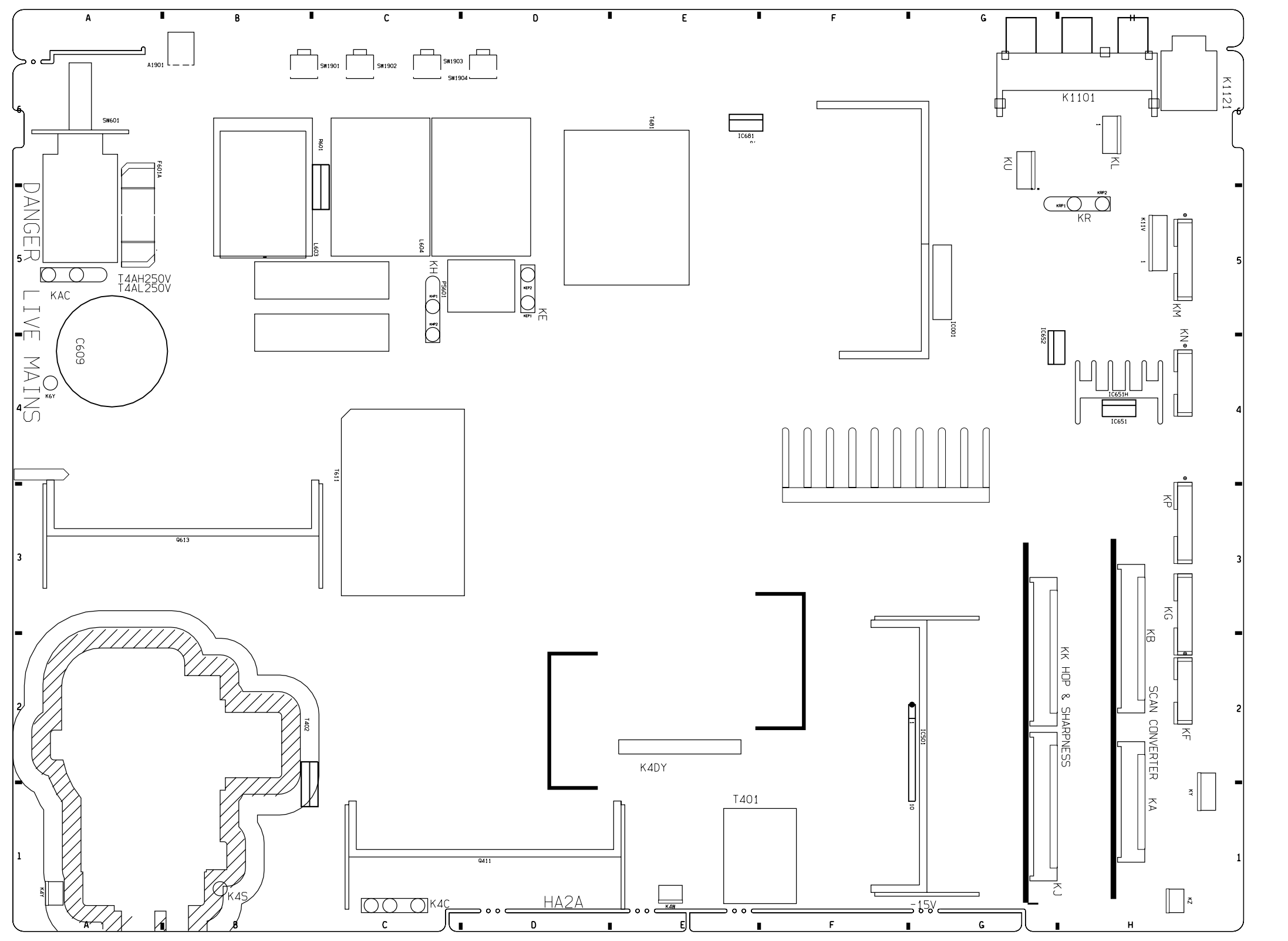
## PWB, SCART



## PWB, TV AND SIGNAL



## POWER & DEFLECTION BOARD



COLOUR TELEVISION

**SANYO**

| | |
|---|---|
| CHASSIS SERIES | HA2A |
| MODEL NUMBER | CE28H2-C |
| SERVICE REF.NO. | CE28H2-C-00 |

Part No. 1AA6P2P1033-- C2WHV (SHEET 1/3 )

**The service Precaution:**
The area enclosed by this line ( ⫽⫽⫽ ) is directly connected with AC mains voltage. When servicing the area, connect an isolating transformer between TV receiver and AC line to eliminate hazard of electric shock.

**Product safety notice:**
Product safety should be considered when a component replacement is made in any area of a receiver. Components indicated by a mark ⚠ in this circuit diagram show components whose values have special significance to product safety. It is particularly recommended that only parts specified on the part service manual be used for components replacement pointed out by the mark.

**Circuit diagram notes :**

1. All resistance values are in ohms, K=1,000, M=1,000,000.
2. All resistance rated wattages are 1/6W unless otherwise noted.
3. Excepting electrolytic capacitors, all capacitance values of less than 1 are expressed in μF and more than 1 are pF.
4. All capacitance rated voltages are 50V unless otherwise noted.
5. All inductance values are in μH.
6. Voltage readings taken a digital voltmeter are from point indicated chassis ground. Voltage readings taken by using a colour bar signal are with all controls at normal position. Some voltages may vary with signal strength.
7. Waveforms were taken with colour bar and controls adjusted for normal picture. Waveforms were taken by using a wide band oscilloscope and a low capacity probe.
8. This circuit diagram covers a basic or representative chassis only. There may be some components or partial circuit differences between the actual chassis and the circuit diagram.
9. ■ Diode 1S1555 may be replaced with 1S2473, 1S2076 or DS472 unless otherwise noted.
   ■ Transistor 2SC536(Q,R,S), 2SC1740(Q,R,S), 2SC945A(Q,R,P) or 2SC1815(G,O,Y) unless otherwise noted.
   ■ Transistor 2SA608(E,F) may be replaced with 2SA933(Q,R), 2SA564(QA,RA), or 2SA1015(O,Y) unless otherwise noted.

**Expression of capacitance and resistance in circuit diagram.**

**Capacitance (Example)**
1000 C M 2000 D
Characteristic
Capacitance value (220pF)
Tolerance (±20%)
Kind(Ceramic)
Rated voltage (1,000V)

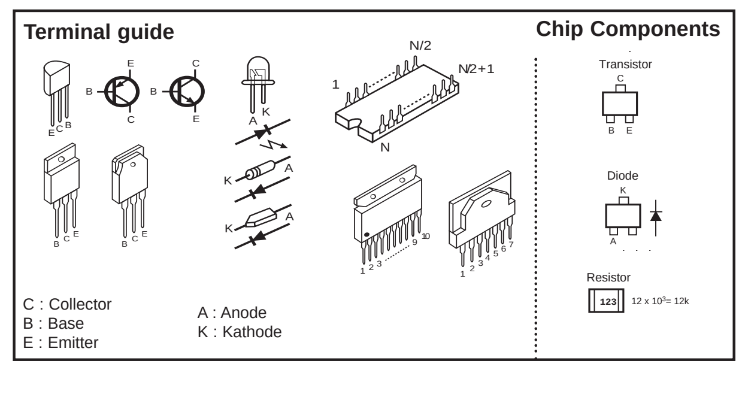
**Resistance (Example)**
1/2 N J 1.2
Resistance value (1.2Ω)
Tolerance (±5%)
Kind (M.carbon)
Rated wattage(1/2W)

J= ± 5%
K= ± 10%
M= ± 20%

T, A, U, D : Electrolytic
C, K, B : Ceramic
F : Mylar film
M, N : Polypropylene
Z : Metallized paper

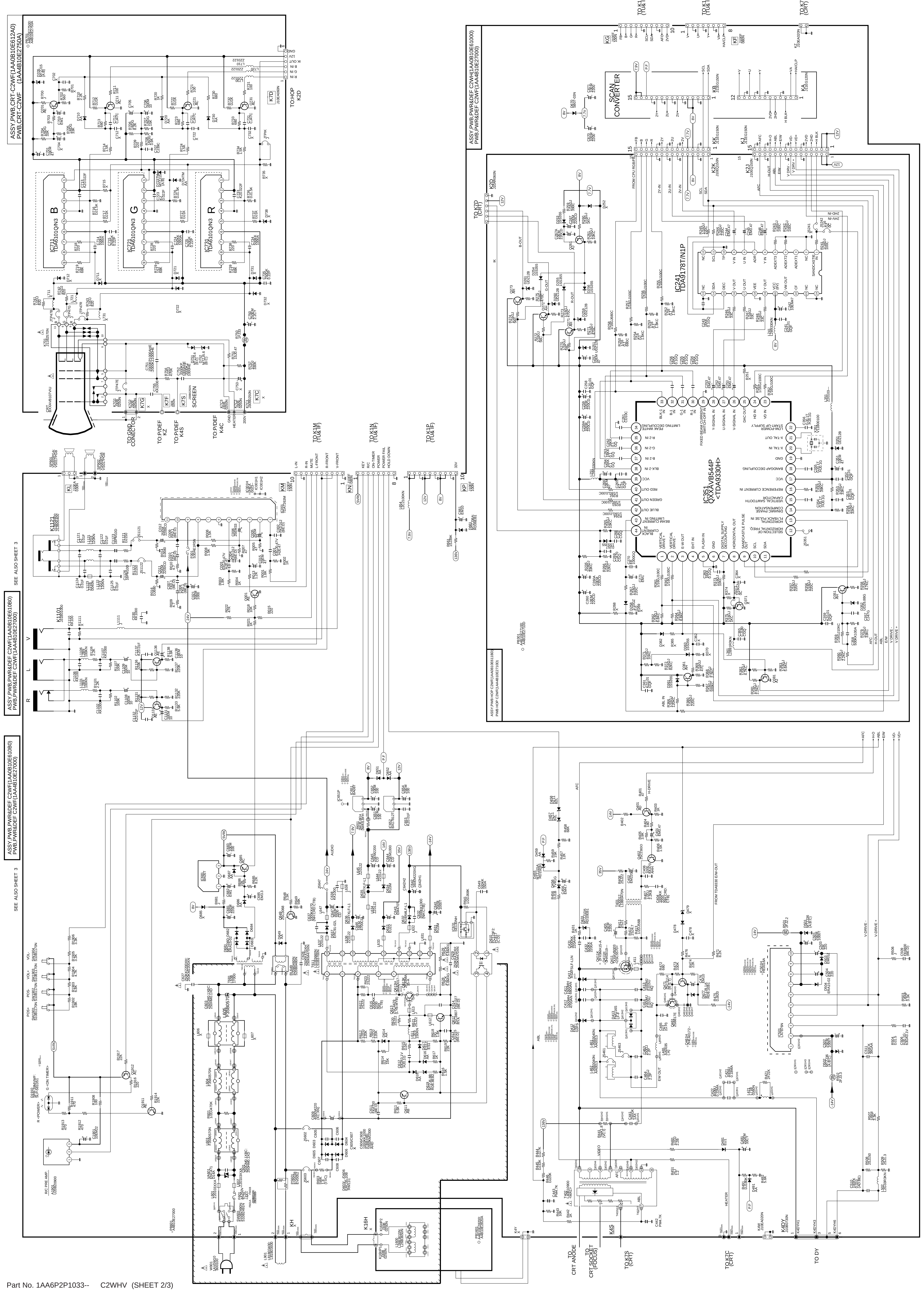
D : Carbon
N : Metallized carbon
S : Oxide metallized
W : Wire wounding
C : Solid

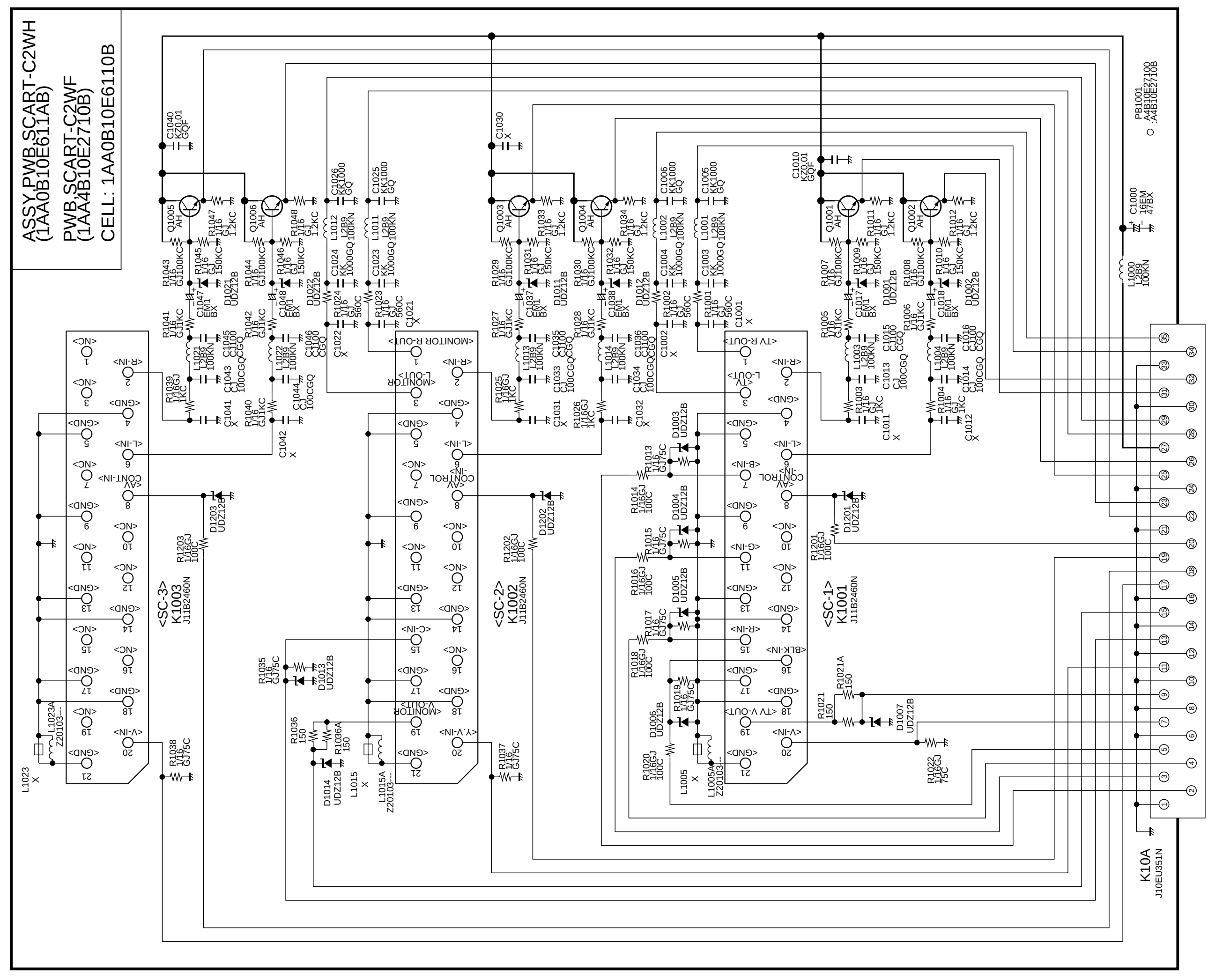
**Terminal guide** **Chip Components**

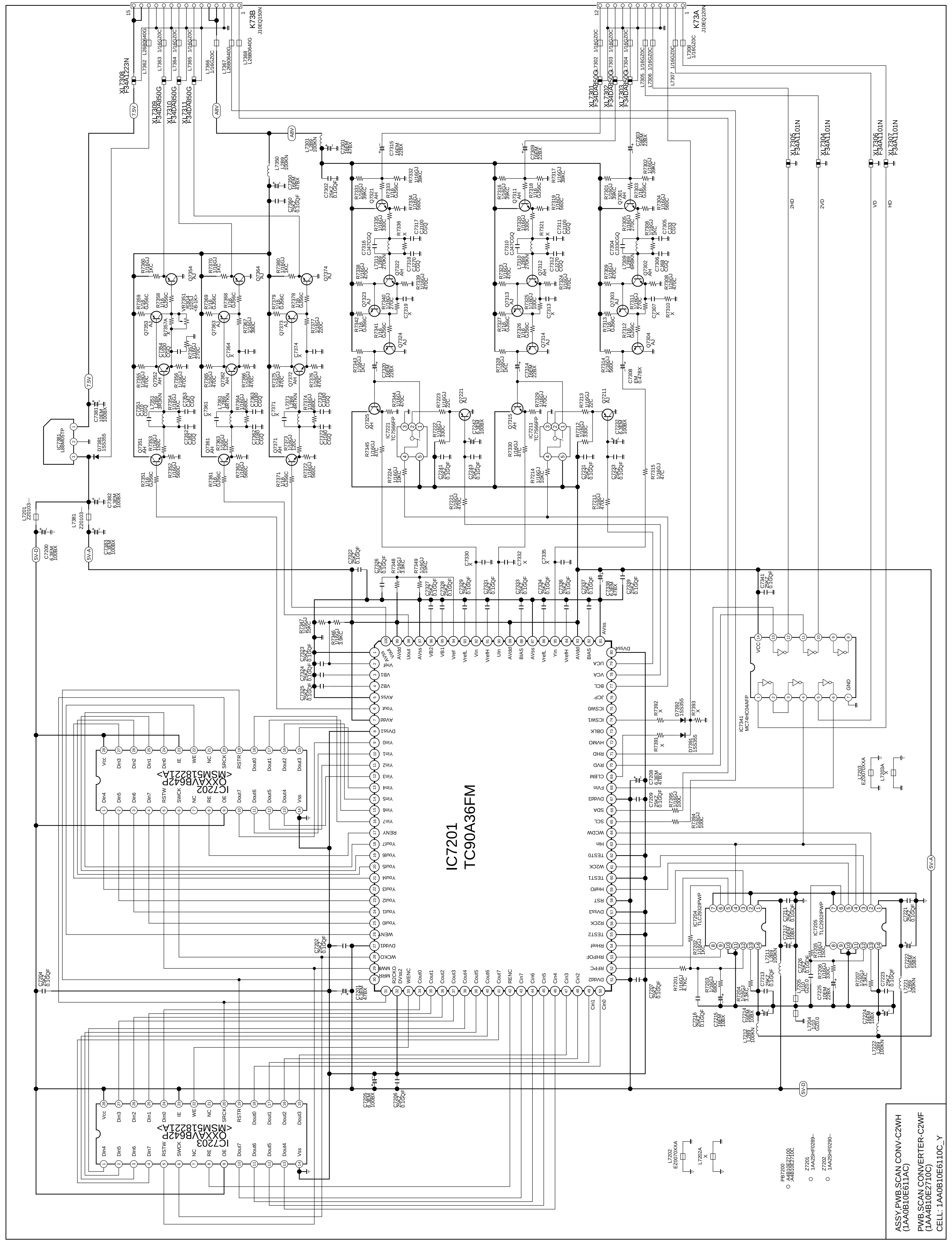


C : Collector
B : Base
E : Emitter

A : Anode
K : Kathode

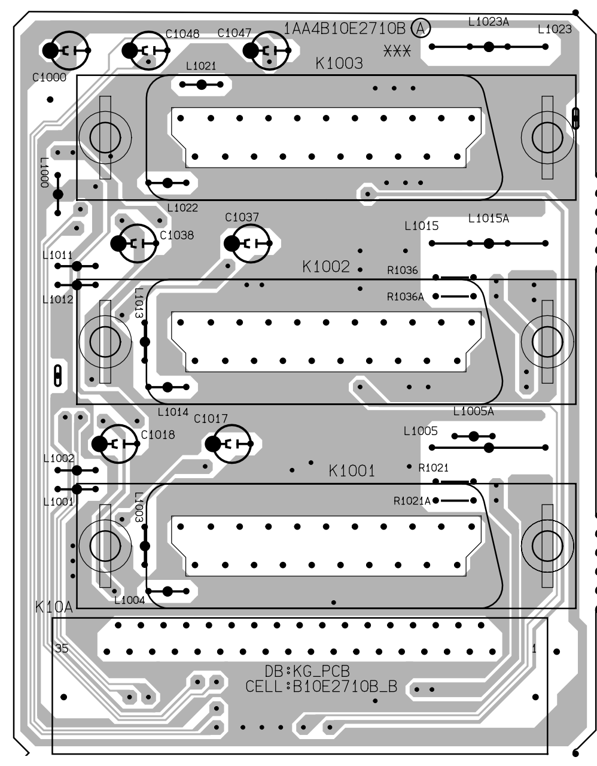

ASSY,PWB,CRT-C2WF(1AA0B10E612A0)
PWB,CRT-C2WF (1AA4B10E2750A)
IC711 TDA6101Q/N3
IC721 TDA6101Q/N3
IC731 TDA6101Q/N3
B
G
R
SCREEN
ASSY,PWB,PWR&DEF C2WH(1AA0B10E61000)
PWB,PWR&DEF C2WF(1AA4B10E27000)
SCAN CONVERTER
IC241 TDA9178T/N1P
IC351 QXXAVB544P <TDA9330H>
ASSY,PWB,PWR&DEF C2WF(1AA0B10E610B0)
PWB,PWR&DEF C2WF(1AA4B10E27000)
SEE ALSO SHEET 3
R
L
V
K1101
POS+
POS-
VOL+
VOL-
SW1901 S10B1170N
SW1902 S10B1170N
SW1903 S10B1170N
SW1904 S10B1170N
CRT ANODE
TO DY



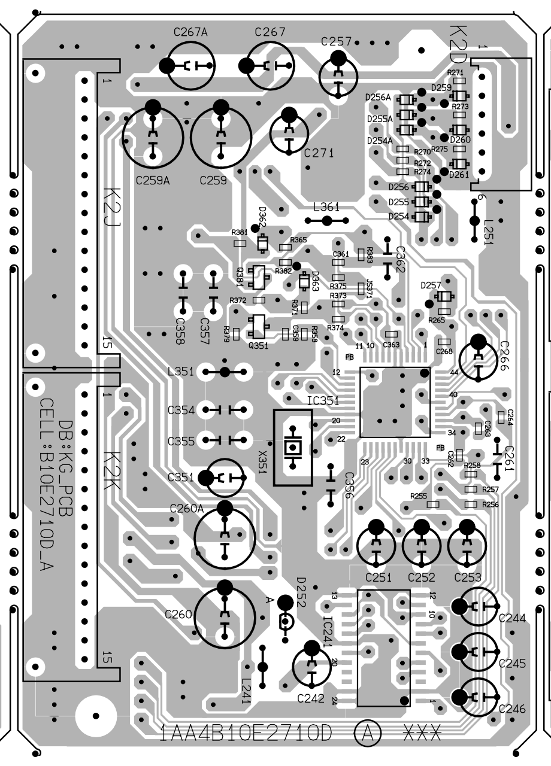


Part No. 1AA6P2P1033-- C2WHV (SHEET 2/3)

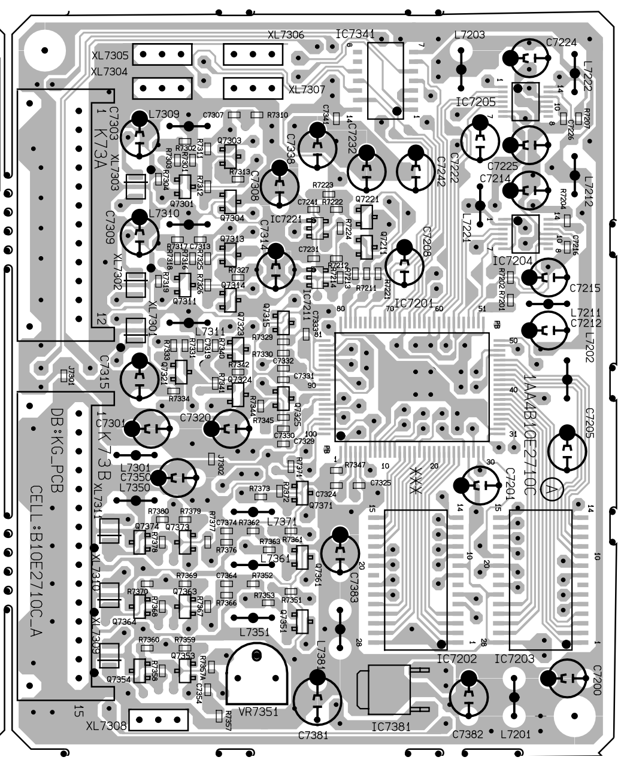
## PWB, SCART
(CIRCUIT SIDE)



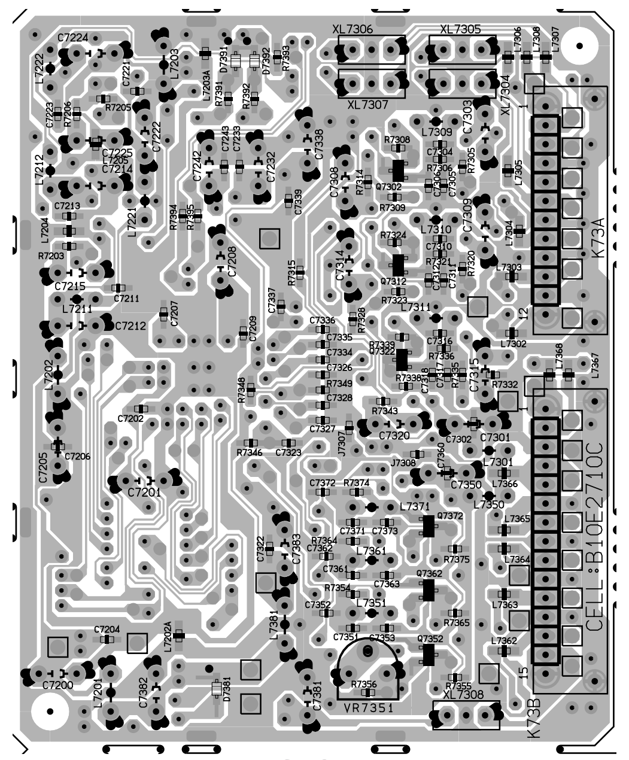
## PWB, HOP
(CIRCUIT SIDE)



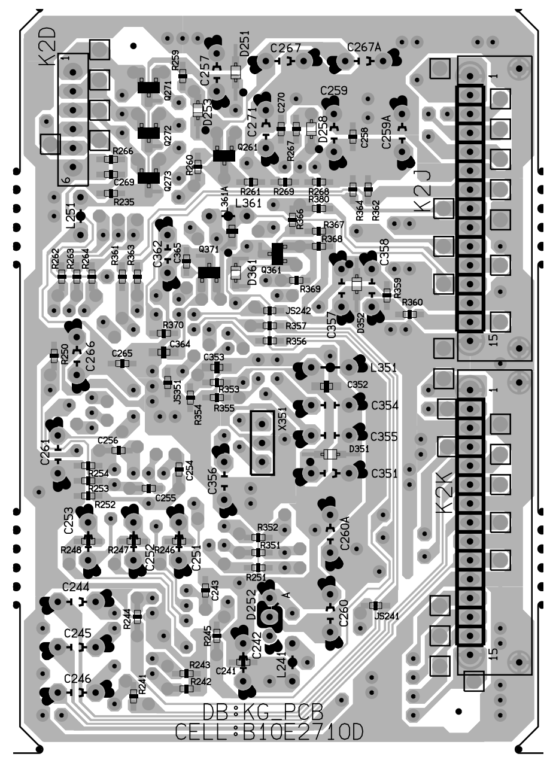
## PWB, SCAN CONVERTER
(CIRCUIT SIDE)



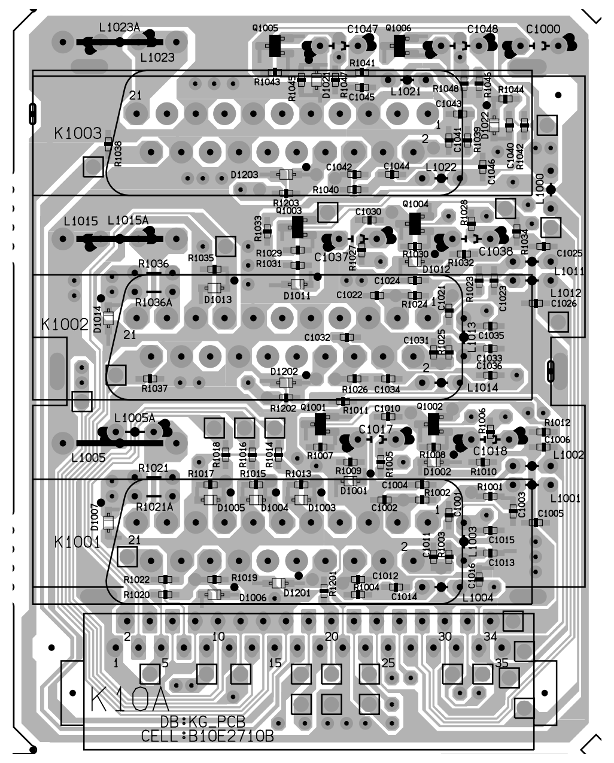
## PWB, SCAN CONVERTER
(CIRCUIT SIDE)



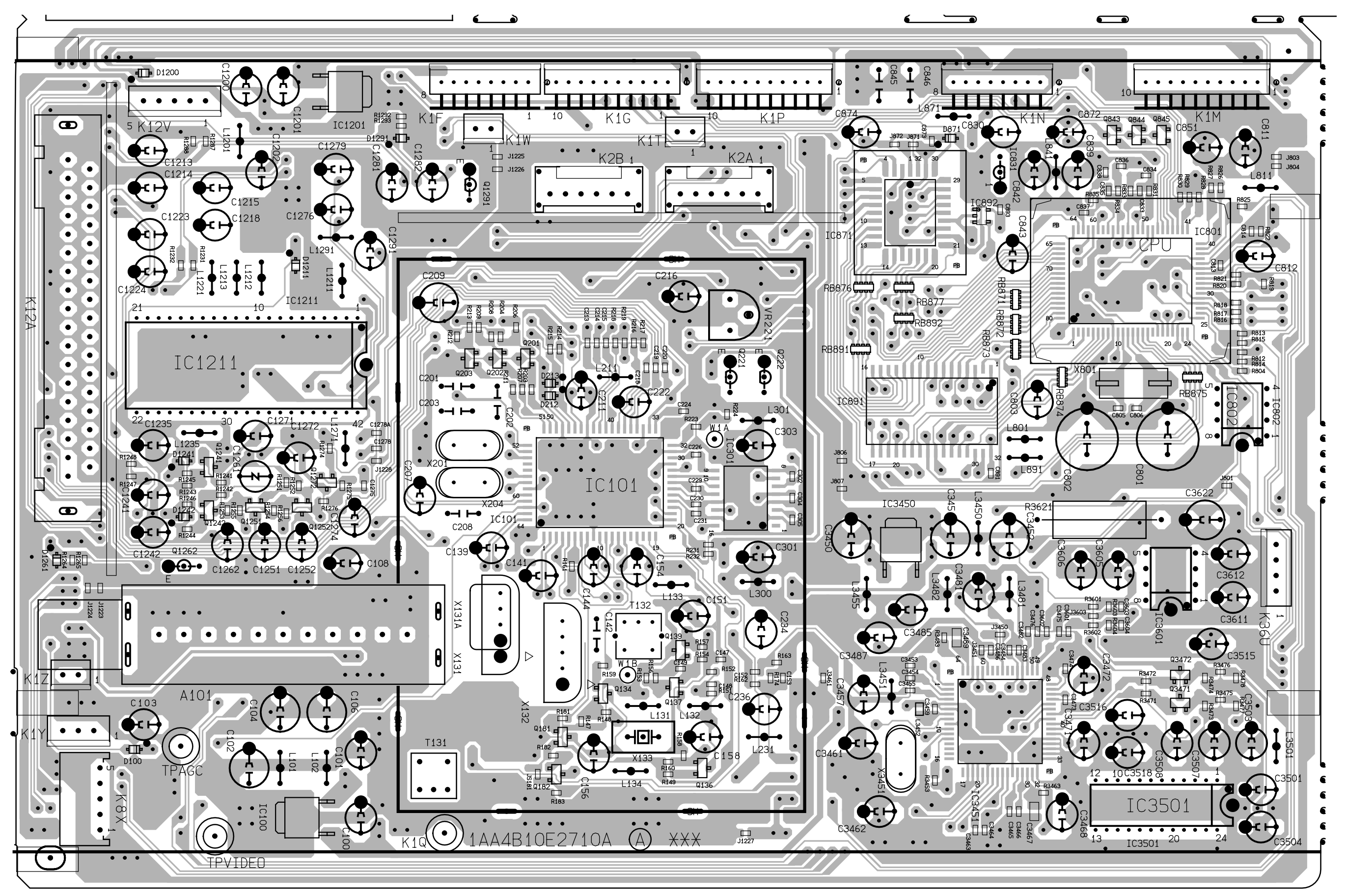
## PWB, HOP
(CIRCUIT SIDE)



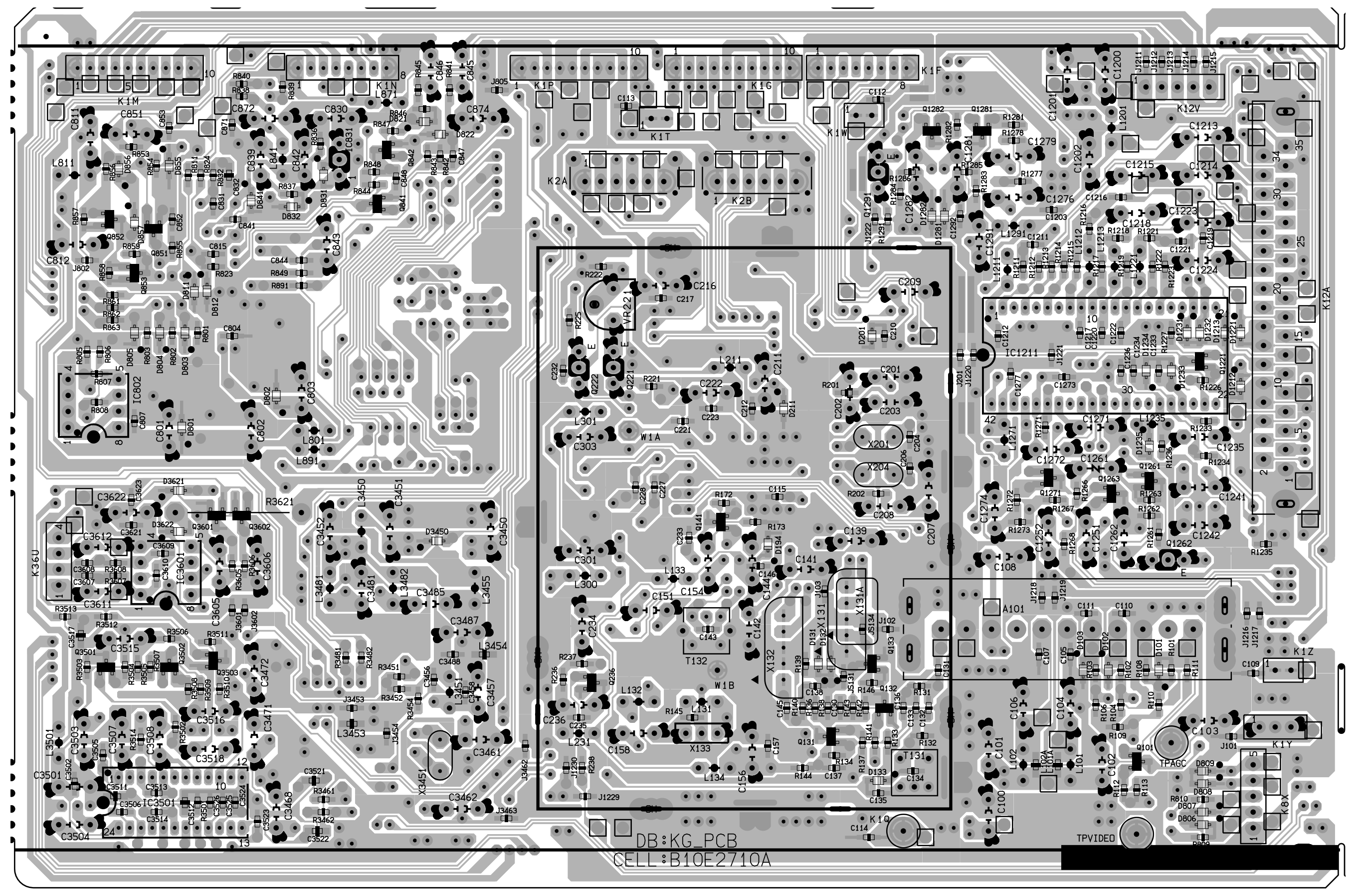
## PWB, SCART
(CIRCUIT SIDE)



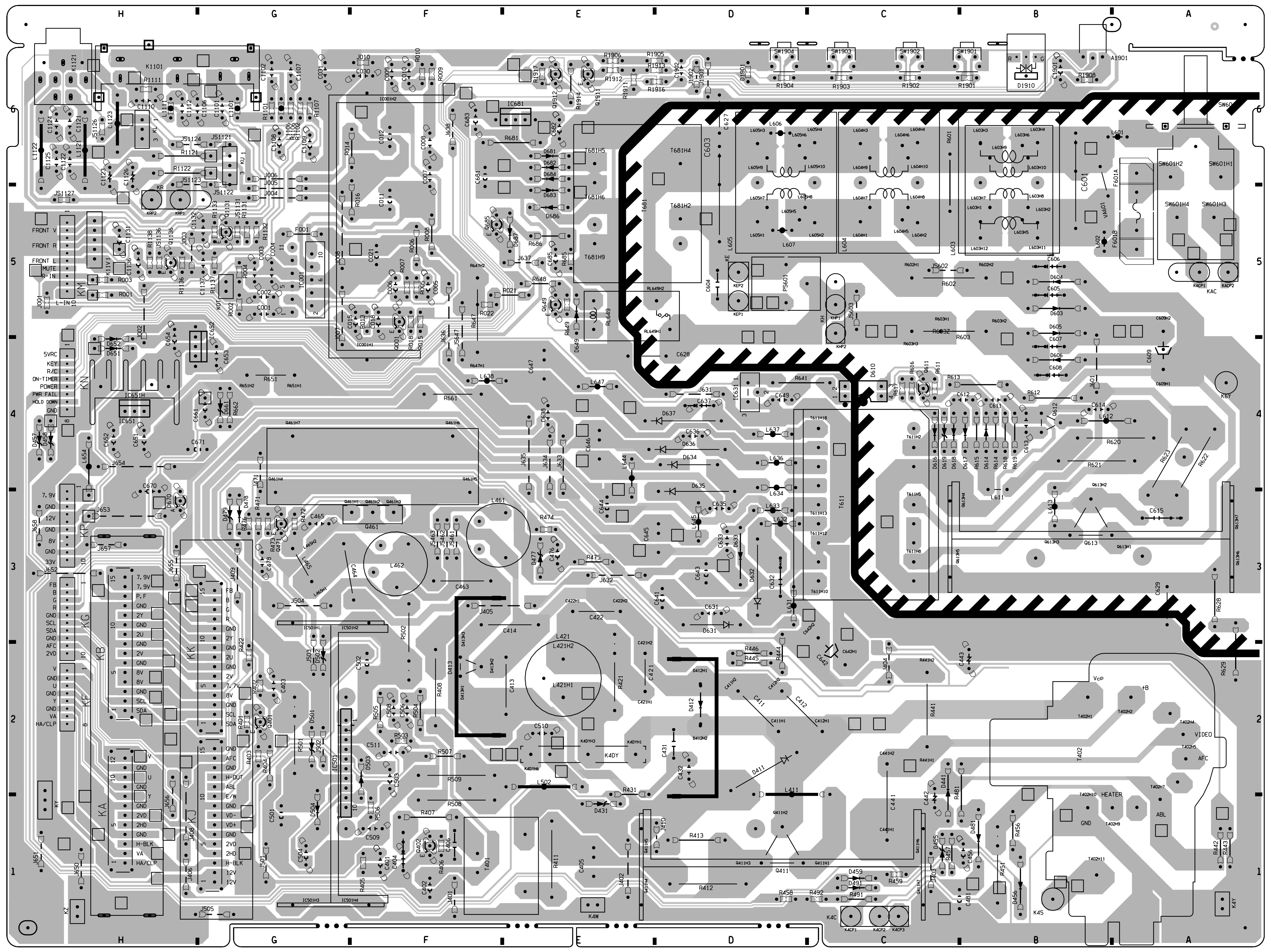
## PWB, TV AND SIGNAL
(CIRCUIT SIDE)



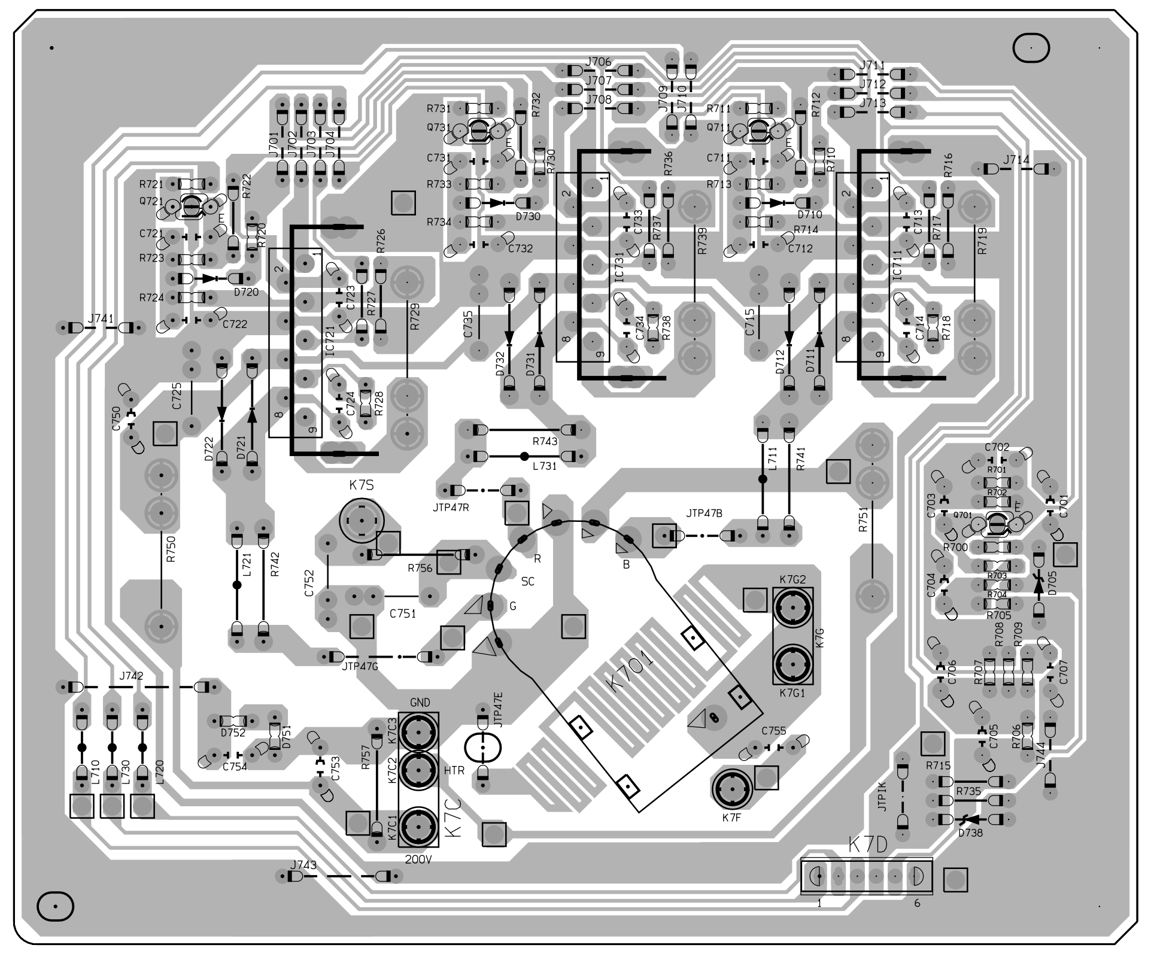
## PWB, TV AND SIGNAL
(CIRCUIT SIDE)



## POWER & DEFLECTION BOARD



## PWB, CRT
(CIRCUIT SIDE)



**SERVICE ADJUSTMENTS**

## [SERVICE ADJUSTMENT]

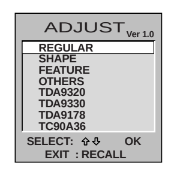
Note: Some items of the service adjustments for this chassis are controlled by the CPU, IC801, these adjustments are carried out by using the RC handset.

**IMPORTANT NOTICE**

Do not attempt to adjust service adjustments not listed in this manual , it may result in a loss of performance and product safety.

### To enter to the Service Mode

+ Press and hold the "**GREEN**" button (remote control) and **P▲** button on TV front control panel. The adjustment window will appear on the screen.

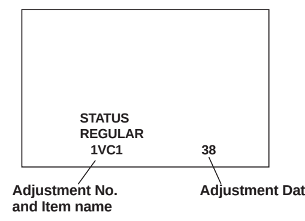


ADJUST Ver 1.0
REGULAR
SHAPE
FEATURE
OTHERS
TDA9320
TDA9330
TDA9178
TC90A36
SELECT: ⇧⇩ OK
EXIT : RECALL

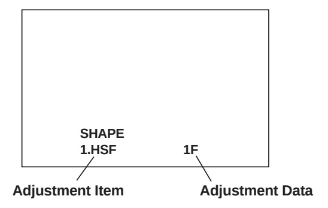
### To select the mode and service item and change data value

+ Highlight the desired adjustment mode (**REGULAR** or **SHAPE** mode **)** by using the **P▲** or **P▼ button** and then press the **OK** button.
+ To select the adjustment item, use the **P▲** or **P▼ button**.
+ To change the service data, use the **Volume -(LEFT)** or **Volume + (RIGHT)** button.
+ The data which is set in the service mode is stored into the memory IC automatically.

**REGULAR mode**



**SHAPE mode**



**SERVICE ADJUSTMENTS**

## ADJUSTABLE SERVICE ADJUSTMENT

**IMPORTANT NOTICE**

Do not attempt to change the data value of service items not listed in the table below otherwise it may cause loss of performance and product safety. If you can not restore the data value of each service item, please initialize the momory IC following to the below description "INITIALIZATION OF MEMORY IC" and re-adjust all of service adjustments.

**[REGULAR]**

| Item No. | OSD | Description |
|---|---|---|
| 1 | 1VC1 | B/G VCO Adjustment |
| 2 | 2VC2 | France-L/L' VCO Adjustment |
| 3 | 3AGC | AGC Adjustment |
| 4 | 4SCR | Screen Adjustment |
| 5 | 5GRY | White Balance Adjustment |
| 6 | 6CUT | Cut-Off Drive Adjustment |
| 7 | 7CTR | Contrast Adjustment |
| 8 | 8OSD | OSD Positioning Adjustment |

**[SHAPE]**

| Item No. | OSD | Description |
|---|---|---|
| 1 | 1.HSF | Horizontal Centre Adjustment |
| 3 | 3.EWW | Horizontal Width Adjustment |
| 4 | 4.EWP | Pcc Adjustment |
| 9 | 9.VAM | Vertical Height Adjustment |
| 13 | 13.VSC | Vertical Centre Adjustment |

### Exit from the Service Mode

+ Press the **RECALL** button or turn off the TV set by using the Mains switch.

### [INITIALIZATION OF MEMORY IC]

To initialize the memory IC (IC802), press and hold the "**NORMAL**" button and then press the **P▲** button on the front control panel, **and then turn the Mains switch Off and On**. Now the initialization is completed.
When initialized the memory IC, all of the setting data (feature setting data, option data and service adjustment data) stored in the IC are reset to the default value. So it is necessary to set the feature setting, option setting and readjust the service adjustments listed.

**SERVICE ADJUSTMENTS**

## [ADJUSTMENTS]

For how to adjust each service data, Please see "SERVICE ADJUSTMENT on page 12 for Entering the Service mode , Selecting service item and Adjusting the service data value.

**IMPORTANT NOTICE**

Do not attempt to adjust service adjustments except those requiring readjustments in servicing otherwise it may cause loss of performance and product safety.

### IF VCO ADJUSTMENT

**PAL BG VCO ADJUSTMENT**

1. Apply 38.9MHz signal to IF terminal on the tuner.
2. Set system mode to "S-1".
3. Enter to the service mode and select mode "REGULAR", item "REGULAR 1VC1".
4. Press the **LEVEL+** or **LEVEL -** button to set data value to be "10".

**SECAM L/L' VCO ADJUSTMENT (French model Only)**

1. Apply 34.3MHz signal to IF terminal on the tuner.
2. Set system mode to "S-4".
3. Enter the service mode and select mode "REGULAR", item "REGULAR 2VC2".
4. Press the **LEVEL+** or **LEVEL -** button to set data value to be "10".

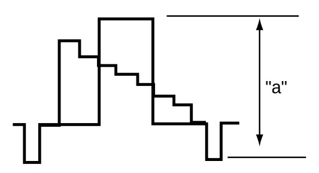
### RF-AGC ADJUSTMENT

1. Receive colour bar pattern with 63dBuV/75Ω terminated signal gain.
2. Connect digital voltmeter to TP-AGC and GND.
3. Set system mode to "S-1".
4. Enter the service mode and select mode "REGULAR", item "REGULAR 3AGC".
5. Press the **LEVEL+** or **LEVEL -** button to adjust voltage to be 3.2Vdc.

### VIDEO LEVEL ADJUSTMENT

**VIDEO LEVEL ADJUSTMENT-1**

1. Receive colour bar pattern.
2. Connect oscilloscope to terminal TPVIDEO and GND.
3. Adjust amplitude "a" to be 1.0Vp-p by using VR221.



**VIDEO LEVEL ADJUSTMENT-2**

1. Receive colour bar pattern.
2. Connect oscilloscope to terminal 8 of K73A and GND. Connect oscilloscope to terminal 11 of K73B and GND.
3. Adjust the amplitude of waveforms to be same by using VR7351.

### FOCUS ADJUSTMENT

By using FOCUS VR, adjust focus control for well defined scanning lines.

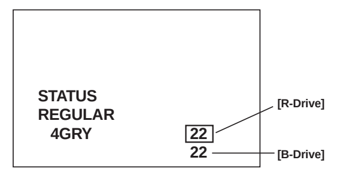
### GREY SCALE ADJUSTMENT

**SCREEN ADJUSTMENT**

1. Select AV1 mode with no signal input.
2. Enter the service mode and select mode "REGULAR", item "REGULAR 4SCR".
3. Turn the **SCREEN VR** to set data value to be "11".

**GREY SCALE ADJUSTMENT**

4. Enter the service mode and select mode "REGULAR", item "REGULAR 5GRY".
5. Adjust [R-Drive] and [B-Drive] control to obtain proper white balance by using **LEVEL+** or **LEVEL -** button.
   a) Select [R-Drive] or [B-Drive] by using the **P▲** or **P▼** button.
   b) Adjust [R-Drive] or [B-Drive] by using the **LEVEL+** or **LEVEL -** button.



Adjustable Range:
00 ~ 3F, 4F ~ 7F, 80 ~ BF, C0 ~ FF

**SERVICE ADJUSTMENTS**

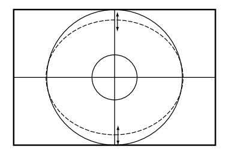
### VERTICAL ADJUSTMENT

**VERTICAL CENTRING ADJUSTMENT**

1. Receive circular pattern..
2. Enter to the service mode and select mode "SHAPE, item "SHAPE 13.VSC".
3. Press the **LEVEL+** or **LEVEL -** button to adjust vertical centre.

**VERTICAL HEIGHT ADJUSTMENT**

1. Receive circular pattern .
2. Enter to the service mode and select mode "SHAPE", item "SHAPE 9.VAM".
3. Press the **LEVEL+** or **LEVEL -** button to adjust the vertical height.



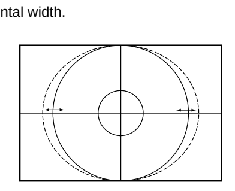
### HORIZONTAL ADJUSTMENT

**HORIZONTAL CENTRING ADJUSTMENT**

1. Receive circular pattern .
2. Enter to the service mode and select mode "SHAPE", item "SHAPE 1.HSF".
3. Press the **LEVEL+** or **LEVEL -** button to adjust horizontal centre.

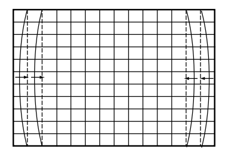
**HORIZONTAL WIDTH ADJUSTMENT**

1. Receive circular pattern.
2. Enter to the service mode and select mode "SHAPE", item "SHAPE 3.EWW".
3. Press the **LEVEL+** or **LEVEL -** button to adjust the horizontal width.



### PCC ADJUSTMENT

1. Receive circular pattern.
2. Enter to the service mode and select mode "SHAPE", item "SHAPE 4.EWP".
3. Press the **LEVEL+** or **LEVEL -** button to adjust the vertical line to be straight.

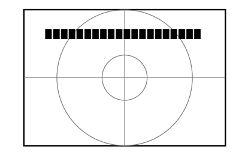


### HIGH-VOLTAGE CONFIRMATION

1. Receive circular pattern.
2. Connect digital volt-meter to both terminals of R442, and high voltage meter to CRT anode.
3. Confirm high voltage to be 26.5KV ± 1 KV at beam current 1.4mA, and less than 29.5 KV at 0 beam current.

### OSD CENTRING ADJUSTMENT

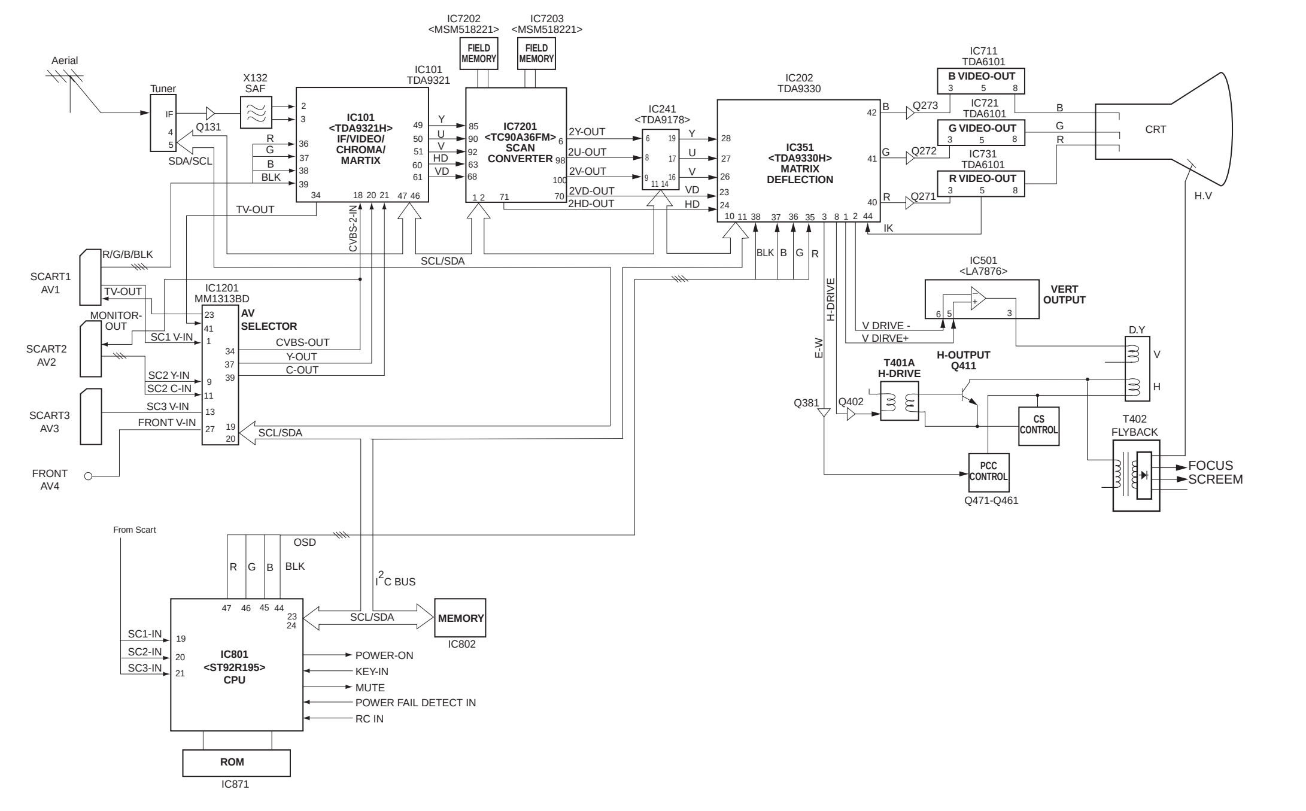
1. Receive circular pattern.
2. Enter to the service mode and select mode "REGULAR", and select item no. 8 "REGULAR 8 OSD". The OSD test bar will appear on the top of screen.
3. Press the **LEVEL+** or **LEVEL -** button to adjust proper OSD positioning.



## CPU PORT FUNCTIONS

| Pin No. | Function Name | Function | IN/OUT |
|---|---|---|---|
| 1 | MMU0 | | OUT |
| 2 | MMU3 | | OUT |
| 3 | ADDR10 | Address bus 10 | OUT |
| 4 | DSN | | |
| 5 | ADDR11 | Address bus 11 | OUT |
| 6 | ADDR9 | Address bus 9 | OUT |
| 7 | ADDR8 | Address bus 8 | OUT |
| 8 | RWN | | |
| 9 | GND | | |
| 10 | VDD | | IN |
| 11 | OSC-IN | Clock Input | IN |
| 12 | OSC-OUT | Clock Output | OUT |
| 13 | ADDR13 | Address bus 13 | OUT |
| 14 | ADDR14 | Address bus 14 | OUT |
| 15 | MMU1 | | OUT |
| 16 | MMU2 | | OUT |
| 17 | MMU4 | | OUT |
| 18 | MMU5 | | OUT |
| 19 | SCART 3 | SCART 3 Input H: AV | IN |
| 20 | SCART 2 | SCART 2 Input H: AV | IN |
| 21 | SCART 1 | SCART 1 Input H: AV | IN |
| 22 | FRONT SC SW | Front AV Switch Input H : Front | IN |
| 23 | SDA | IIC SDA | IN/OUT |
| 24 | SCL | IIC SCL | OUT |
| 25 | RC-IN | Remote Control Signal Input | IN |
| 26 | SERVICE IN | Service Switch Input On: L | IN |
| 27 | SERVICE ACK | External Bus Switch Output ACK: L | OUT |
| 28 | PROTECT | Power Failure Detection Inout L: Failure | IN |
| 29 | Hold Down | Hold Down (High Voltage Detection Input) L: Hold Down On | IN |
| 30 | 50/60 | 50/60Hz Switch Output 50: H 60: L | OUT |
| 31 | MUTE | Sound Mute Output On: H | OUT |
| 32 | SUPER 3D | Super 3D Switch Output On: L | OUT |
| 33 | Phone Mute | Phone Mute | OUT |
| 34 | VDD | | IN |
| 35 | GND | | |
| 36 | IF AGC | IF AGC Input | IN |
| 37 | KEY-IN | Key Input TV Key | IN |
| 38 | RF AGC IN | RF AGC Input | IN |
| 39 | NA | | |
| 40 | NA | | |
| 41 | LED-2 | LED Drive Output | OUT |
| 42 | NA | | |
| 43 | POWER | Power On/Off Drive H: Power-On | OUT |
| 44 | FB | BLK Output for OSD | OUT |
| 45 | B | Blue Output for OSD | OUT |
| 46 | G | Green Output for OSD | OUT |
| 47 | R | Red Output for OSD | OUT |
| 48 | V-SYNC | V-Sync Input | IN |
| 49 | H-SYNC | H-Sync Input | IN |
| 50 | WSCR | | |
| 51 | WSCF | | |
| 52 | VDD-A | | IN |
| 53 | PXFM | | |
| 54 | RESET | Reset Input | IN |
| 55 | MCFM | | |
| 56 | JTRSTO | | |
| 57 | TXCF | | |
| 58 | CVBS0 | | |
| 59 | TEST0 | | |
| 60 | CVBS1 | | |
| 61 | CVBS2 | | |
| 62 | GND-A | | |
| 63 | DAT3 | Data bus 3 | IN |
| 64 | DAT4 | Data bus 4 | IN |
| 65 | DAT5 | Data bus 5 | IN |
| 66 | DAT6 | Data bus 6 | IN |
| 67 | DAT7 | Data bus 7 | IN |
| 68 | DAT2 | Data bus 2 | IN |
| 69 | DAT1 | Data bus 1 | IN |
| 70 | DAT0 | Data bus 0 | IN |
| 71 | ADDR0 | Address bus 0 | OUT |
| 72 | ADDR1 | Address bus 1 | OUT |
| 73 | ADDR2 | Address bus 2 | OUT |
| 74 | ADDR3 | Address bus 3 | OUT |
| 75 | ADDR4 | Address bus 4 | OUT |
| 76 | ADDR5 | Address bus 5 | OUT |
| 77 | ADDR6 | Address bus 6 | OUT |
| 78 | ADDR7 | Address bus 7 | OUT |
| 79 | ADDR12 | Address bus 12 | OUT |
| 80 | ADDR15 | Address bus 15 | OUT |

## BLOCK DIAGRAM (OUTLINE)



## BLOCK DIAGRAM (AV SELECTOR/ NICAM DECODER)

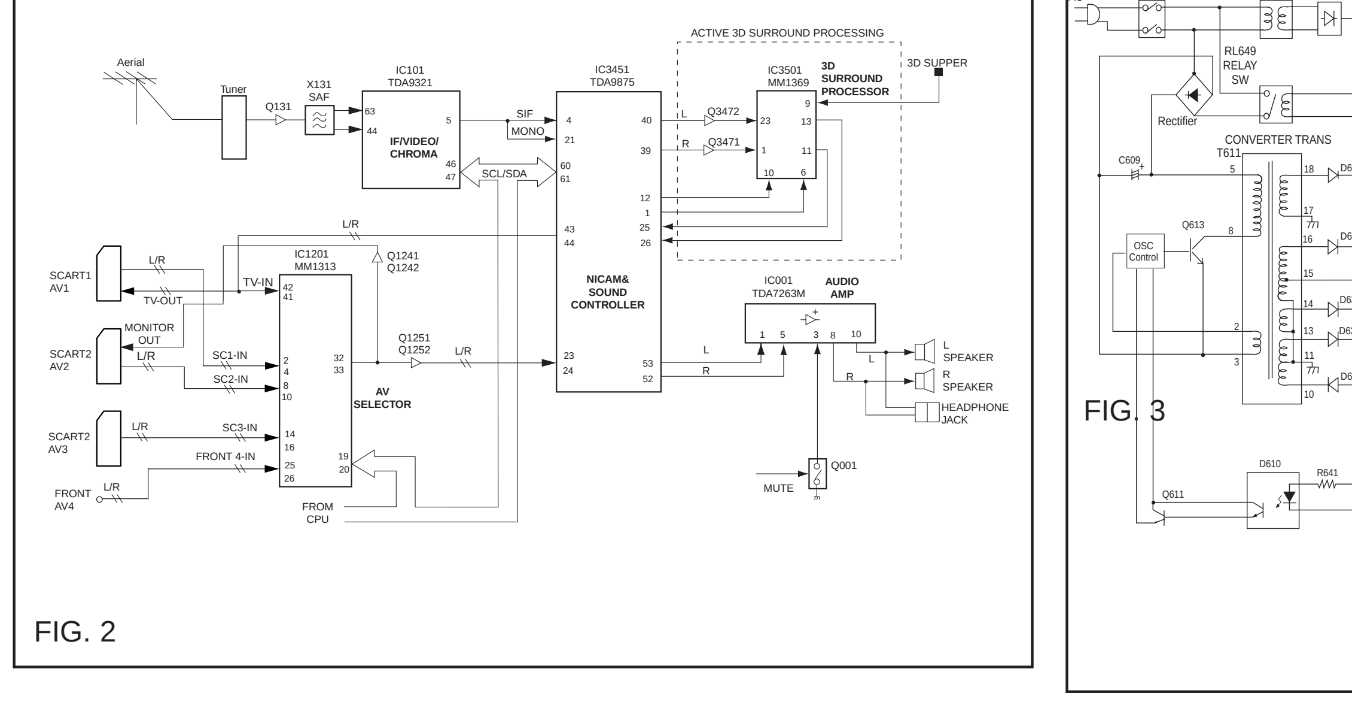


FIG. 2

## BLOCK DIAGRAM (SYSTEM CONTROL)

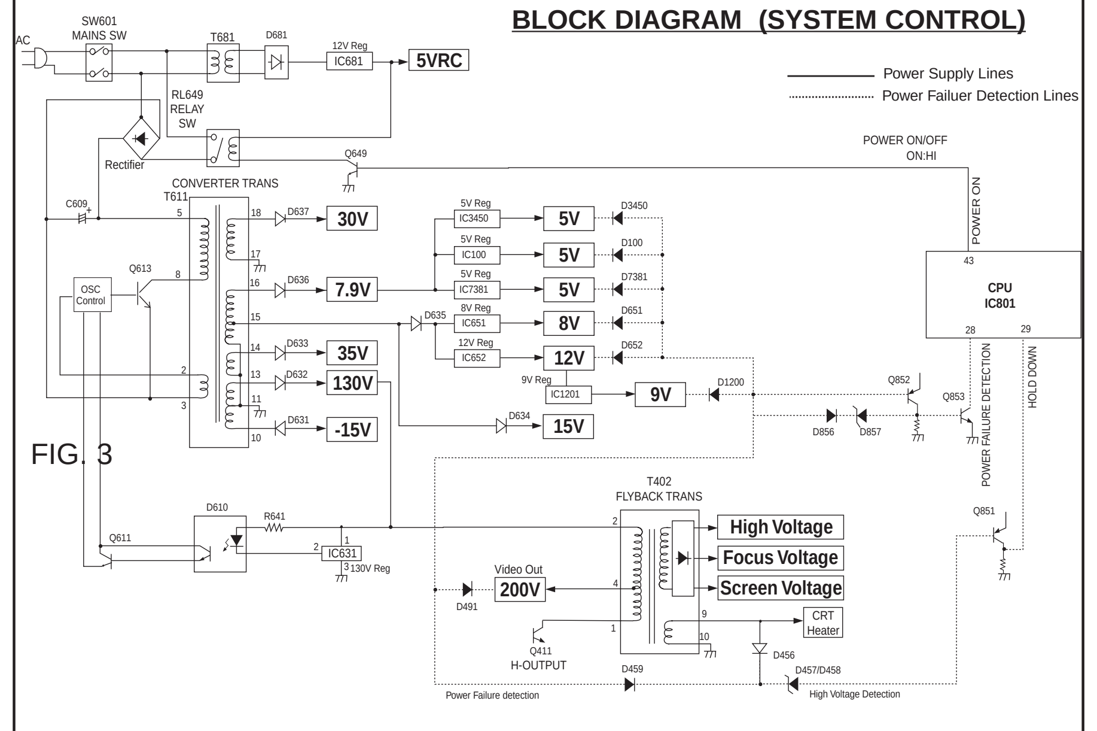


FIG. 3